REMARKS

Reconsideration and allowance of the present application are respectfully requested. Claims 1, 4-6, 8, 9, 16, 18, 19 and 21-25 and 27 remain pending in the application. By the foregoing amendment, claims 1, 5, 16, 18 and 21 are amended; and claims 7, 26 and 28 are canceled.

In numbered paragraph 1, page 2 of the Office Action, claims 1, 4 and 24-27 were rejected under 35 U.S.C. §112, second paragraph. Specifically, the Office Action asserts that claim 1 is indefinite because "'evaluating the polynomial for the determined interval with said input data value' is 'revising said data value'." While Applicants respectfully disagree with the Examiner's ultimate conclusion, claim 1 is amended to obviate the Examiner's assertion. For example, claim 1 is amended to recite "evaluating the polynomial for the determined interval with said media signal and the retrieved coefficients to thereby transform said media signal." Withdrawal of the rejection under 35 U.S.C. §112, second paragraph, is respectfully requested in light of the foregoing amendment.

In numbered paragraph 2, page 2 of the Office Action, claims 1, 4-9 and 21-28 were rejected under 35 U.S.C. §101, as being directed to non-statutory subject matter. While Applicants respectfully disagree with the Examiner's ultimate conclusion, the relevant claims are amended to obviate the Examiner's assertion. For example, claim 1 is further amended to recite "outputting data values as digital representations of said transformed media signal"; claim 5 is amended to recite "generating multiple output values corresponding to said input data values to form digital representations of said media output signal"; claim 16 is amended to recite "to output digital representations of said output values"; and claim 21 is amended to

recite "to generate multiple output values at the same time that define digital representations of an output media signal." Applicants have clearly set forth of record the holding in the *State Street* decision which supports the proposition that data values that represent a media signal constitute as much of a practical application as the dollar amounts that were addressed in the *State Street* decision. Withdrawal of the rejection under 35 U.S.C. §101 is requested in light of the foregoing amendment.

In numbered paragraph 3, page 3 of the Office Action, claims 1, 4, 24 and 25 were rejected under 35 U.S.C. §103 as being unpatentable over U.S. Patent 6,002,726 (Simanapalli et al.) in view of U.S. Patent 5,068,816 (Noetzel) and further in view of U.S. Patent 6,931,426 (Cho). In numbered paragraph 4, page 4 of the Office Action, claims 5, 6, 8, 16, 21 and 22 were rejected under 35 U.S.C. §103 as being unpatentable over the Simanapalli et al. patent, the Noetzel patent, the Cho patent, and further in view of U.S. 2003/0195907 (Budge). In numbered paragraph 5, page 5 of the Office Action, claims 18 and 19 were rejected under 35 U.S.C. §103 as being unpatentable over U.S. Patent 6,360,023 (Betrisey et al.) in view of U.S. Patent 5,235,410 (Hurley). These rejections are respectfully traversed.

As shown in the graph of FIG. 3 Applicants have disclosed error forward approximation (e.g., specification at page 8). Applicants have further disclosed an exemplary function curve which is first fitted with one or more polynomials, and a determination is made to see how close the error is to a desired threshold. The order of the polynomial is then raised, and split over multiple ranges, until the error approaches the desired value (e.g., specification at page 8).

Claim 1

In numbered paragraph 3, page 3 of the Office Action, the Examiner admits that "[i]t is further noted that the combination of Simanapalli et al and Noetzel does not disclose the length of each interval being individually defined as recited in the claims."

Further to the Applicants' argument of record, Applicants have further clarified claim 1 to recite a method for processing a media signal, comprising the steps of: using a Chebyshev minimax approximation technique to determine a plurality of polynomials which approximate a mathematical function over a plurality of corresponding data intervals, wherein the length of each interval is individually defined so that the approximation of the function over that interval by its corresponding polynomial has an error less than a predetermined threshold for all of the intervals, storing the coefficients that define each polynomial, in response to receipt of said media signal, determining the interval in which a data value of said media signal is located, and retrieving the stored coefficients for the polynomial corresponding to that interval; evaluating the polynomial for the determined interval with said media signal and the retrieved coefficients to thereby transform said media signal; and outputting data values as digital representations of said transformed media signal, wherein said polynomials and intervals are determined such that the maximum error between said output values and said function is approximately equal for each of said intervals.

Applicants respectfully submit that the Cho patent does not cure the deficiencies of the Simanapalli et al. patent and the Noetzel patent. The Cho patent was cited by the Examiner for it's disclosure of an apparatus for detecting an

operation value at high speed using a look-up table, while keeping the size of the look-up table to a minimum (col. 1, lines 46-50). As relied upon by the Examiner, the Cho patent merely discloses "an apparatus for detecting an operation value at high speed using a look-up table that minimizes the error in the real operation value" (col. 1, lines 51-54). The Cho patent as the Examiner relies on would not have taught or suggested a method for processing a media signal including, among other features, using a Chebyshev minimax approximation technique to determine a plurality of polynomials which approximate a mathematical function over a plurality of corresponding data intervals, wherein the length of each interval is individually defined so that the approximation of the function over that interval by its corresponding polynomial has an error less than a predetermined threshold for all of the intervals,...and outputting data values as digital representations of said transformed media signal, wherein said polynomials and intervals are determined such that the maximum error between said output values and said function is approximately equal for each of said intervals, as recited in claim 1.

At least for these reasons, the applied references, individually or in the combination as suggested by the Examiner, would not have taught or suggested the recited features of Applicants' claim 1.

Claims 5, 16 and 21

In numbered paragraph 4, page 4 of the Office Action, the examiner further admits that "[i]t is noted that the combination of Simanapallli et al., Noetzel and Cho does not specifically disclose a polynomial calculation in a vector processor."

Further to the Applicants' argument of record, Applicants have further clarified claims 5, 16 and 21. For example, claim 5 recites a method for generating a media

output signal which is a power function of a media input signal in a vector processing architecture, comprising the steps of: determining polynomials which respectively approximate said power function over contiguous ranges in a data interval, wherein each range has a length which is individually defined so that the approximation of the power function over that range by its respective polynomial has an error less than a predetermined threshold for all of the ranges; storing the coefficients that define said polynomials, in response to receipt of multiple input data values of a media signal, determining the range in which each data value is located; retrieving the stored coefficients for each of the determined ranges; evaluating the polynomials whose coefficients are retrieved with the associated input data values in a vectorized manner; and generating multiple output values corresponding to said input data values to form digital representations of said media output signal, wherein said polynomials and ranges are determined such that the maximum error between said output values and the power function is approximately equal for each of said ranges.

For the like reasons as set forth above, the Simanapalli et al. patent, the Noetzel patent and the Cho patent, individually or in the combination as suggested by the Examiner, would not have taught or suggested, among other recited features, said polynomials and ranges being determined such that the maximum error between said output values and the power function is approximately equal for each of said ranges, as recited in claims 5, 16 and 21.

Applicants respectfully submit that the Budge patent does not cure the deficiencies of the Simanapalli et al. patent, the Noetzel patent and the Cho patent. The Budge patent was cited by the Examiner for it's disclosure that the "polynomial of degree (4, 5) is particularly attractive because it is quite accurate and is a good fit

with Single-Instruction Stream Multiple-Data Stream (SIMD) architectures that process floating point operations 2 or 4 at a time" (paragraph [0043]). As relied upon by the Examiner, the Budge patent would not have taught or suggested a method for generating a media output signal which is a power function of a media input signal in a vector processing architecture, including, among other features, determining polynomials which respectively approximate said power function over contiguous ranges in a data interval, wherein each range has a length which is individually defined so that the approximation of the power function over that range by its respective polynomial has an error less than a predetermined threshold for all of the ranges; ...and generating multiple output values corresponding to said input data values to form digital representations of said media output signal, wherein said polynomials and ranges are determined such that the maximum error between said output values and the power function is approximately equal for each of said ranges, as recited in claim 5.

At least for these reasons, the applied references, individually or in the combination as suggested by the Examiner, would not have taught or suggested the recited features of Applicants' claims 5, 16 and 21.

Claims 18 and 19

Applicants have disclosed that an exemplary constraint in multimedia applications relates to the function and its inverse over an interval of interest (e.g., page 6, lines 8-10). Applicants have disclosed a particular relevance for power functions, where small deviations over an input range can produce large deviations in the output results (e.g., page 6, lines 11-13). Consequently, the approximation of

a power function and its inverse must have an error that is below a prescribed value, in order to meet this constraint (e.g., page 6, lines 14 and 15).

In numbered paragraph 5, page 5 of the Office Action, the Examiner admits that "[i]t is noted that Betrisey et al. does not disclose the generating a corrected display value by a second-order polynomial that approximates a power function corresponding to the gamma of a display device, and the converting the processing display value to said first color space by evaluating a polynomial that is the inverse of said second-order polynomial."

Further to the Applicants' argument of record, Applicants have further clarified claim 18. For example, claim 18 recites a method for processing an image for display in a computer system, including among other features, generating a corrected display value in a second color space by evaluating a second-order polynomial that approximates a power function corresponding to the gamma of a display device, in accordance with said input display value; ...and converting said processed display value to said first color space by evaluating a polynomial that is the inverse of said second-order polynomial in accordance with said processed display value, wherein the second-order polynomial that approximates a power function and its inverse are such that said evaluating of a polynomial that is the inverse of said second-order polynomial yields an error that is below a prescribed threshold value.

Applicants respectfully submit that the Hurley patent does not cure the deficiencies of the Betrisey et al. patent. The Hurley patent was cited by the Examiner for it's disclosure figure 6 which shows a graph modeling of the desired non-linear operation by a quadratic approximation. The Hurley patent as the

Examiner relies on would not have taught or suggested converting a processed display value to a first color space by evaluating a polynomial that is the inverse of a second-order polynomial in accordance with said processed display value, wherein the second-order polynomial that approximates a power function and its inverse are such that said evaluating of a polynomial that is the inverse of said second-order polynomial yields an error that is below a prescribed threshold value.

At least for these reasons, the applied references, individually or in the combination as suggested by the Examiner, would not have taught or suggested the recited features of Applicants' claim 18. Claim 19 depends from claim 18.

Dependent Claims

The remaining claims are dependent claims that depend from the respective independent claim. In addition to the arguments set forth above, the dependent claims recite additional advantageous features that are allowable. For example, dependent claims 9, 23 and 27 each recite additional features relating to polynomials that are of different respective orders, which features as respectively recited are believed allowable in themselves.

Conclusion

For the foregoing reasons, Applicant's claims 1, 4-6, 8, 9, 16, 18, 19 and 21-25 and 27 are allowable. As such, the present application is in condition for allowance.

All objections and rejections raised in the Office Action having been addressed, it is respectfully submitted that the application is in condition for allowance and a Notice of Allowance is respectfully solicited.

Respectfully submitted,

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